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PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 23 January 2001 (23.01.01)	
International application No. PCT/SE00/00836	**Applicant's or agent's file reference** 110004601/CF
International filing date (day/month/year) 03 May 2000 (03.05.00)	**Priority date** (day/month/year) 04 May 1999 (04.05.99)
Applicant OLSSON, Olle	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

29 November 2000 (29.11.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Charlotte ENGER
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

Form PCT/IB/331 (July 1992)

SE0000836

Copy for the Elected Office (EO/US)

PCT/SE00/00836

PATENT COOPERATION TREATY

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NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

To:

URBAN, Petré
Stockholms Patentbyrå Zacco AB
Box 23101
S-104 35 Stockholm
SUÈDE

Date of mailing (day/month/year)
18 April 2001 (18.04.01)

Applicant's or agent's file reference
110004601/CF

IMPORTANT NOTIFICATION

International application No.
PCT/SE00/00836

International filing date (day/month/year)
03 May 2000 (03.05.00)

1. The following indications appeared on record concerning:

[ ] the applicant [ ] the inventor [X] the agent [ ] the common representative

Name and Address

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State of Residence:

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Teleprinter No.:

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

[ ] the person [ ] the name [X] the address [ ] the nationality [ ] the residence

Name and Address

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S-104 35 Stockholm
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State of Nationality:

State of Residence:

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Facsimile No.: +46 8 31 83 15

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3. Further observations, if necessary:

4. A copy of this notification has been sent to:

[X] the receiving Office
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The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

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Authorized officer

F. Baechler

Telephone No.: (41-22) 338.83.38

Form PCT/IB/306 (March 1994)

003969833

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
110004601/CF		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/SE 00/00836	3 May 2000	4 May 1999
Applicant		
Besam AB et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. [ ] **Certain claims were found unsearchable** (See Box I).

2. [ ] **Unity of invention is lacking** (See Box II).

3. [ ] The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing
   - [ ] filed with the international application.
   - [ ] furnished by the applicant separately from the international application,
     - [ ] but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
   - [ ] transcribed by this Authority.

4. With regard to the title,
   - [X] the text is approved as submitted by the applicant.
   - [ ] the text has been established by this Authority to read as follows:

5. With regard to the abstract,
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   - [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:
   Figure No. 1
   - [X] as suggested by the applicant.
   - [ ] because the applicant failed to suggest a figure.
   - [ ] because this figure better characterizes the invention.
   - [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/00836

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E05F 3/00, E05F 15/02, E05F 15/10, F15B 7/00, F15B 15/18
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E05F, F15B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5651162 A (L. KESZTHELYI), 29 July 1997 (29.07.97) --	1-15
Y	US 5513467 A (A. CURRENT ET AL), 7 May 1996 (07.05.96) --	1-15
Y	EP 0166285 A2 (DORMA BAUBESCHLAG GMBH & CO. KG), 2 January 1986 (02.01.86) --	2-3
A	US 5655371 A (S.-C. CHUANG ET AL), 12 August 1997 (12.08.97) --	

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* Special categories of cited documents:
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"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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Date of the actual completion of the international search	Date of mailing of the international search report
27 July 2000	15 -08- 2000
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Christer Wendenius / MRo Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Inter[redacted]nal application No.
PCT/SE 00/00836

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5046402 A (J.-H. LAGACE), 10 Sept 1991 (10.09.91) -- --------	

INTERNATIONAL [redacted]RCH REPORT
Information on pate[redacted]amily members

02/12/99

Inter[redacted]al application No.
PCT/SE 00/00836

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5651162 A	29/07/97	NONE	
US 5513467 A	07/05/96	NONE	
EP 0166285 A2	02/01/86	SE 0166285 T3	
		DE 3423242 C	07/11/85
		US 4660250 A	28/04/87
US 5655371 A	12/08/97	NONE	
US 5046402 A	10/09/91	NONE	

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Operation Device

TECHNICAL FIELD OF THE INVENTION

The present invention relates to a device for the operating of preferably doors, gates and such operable elements according to the type described in the introduction of claim 1.

BACKGROUND OF THE INVENTION

At operating devices for doors, gates and such elements, it is common to use electrohydraulic systems. If the operating device is to manage pivot operation, it is more common with an electromechanic system. Irrespective of the choice of system, problems arise when a operating device is to be mounted at an already existing operable element. The space available at, e.g., a door is a limiting factor. This may cause expensive alteration costs in order to modify the space. At production of new houses, the cost also increases when operating devices occupy space.

With the classification operating device for elements is referred to devices that cause doors, gates and such to move either linearly or to pivot. The devices permit left hung or right hung elements, outer elements or inner elements and the devices may be placed on optional side of the element.

The patent specification GB 1 406 126 shows an electrohydraulic door opener and the object of the invention is to make a space-saving and handy device. The door opener comprises a combination of a hydraulic motor, a hydraulic fluid tank, a motor driven hydraulic pump and hydraulic lines, which together form a closed hydraulic circuit/loop. A rotating motor drives or operates the pump. In order to save space, a spring housing 14 is also utilized as a hydraulic fluid tank.

The patent specification US 4 333 270 shows an electromechanic door opener. The object of the invention is to make a door opener, which is cheap to manufacture and which fits for different types of pivoting doors. Furthermore, the object is to make a door opener that, among other thing, has a long service life. The solution is based on a construction that, among other things, contains a rack and a gear-wheel. It does not contain any hydraulics.

Problems arise when the operating device should be inexpensive to manufacture and to operate and quiet. The electrohydraulic systems contain numerous and expensive components and are thereby expensive to manufacture. Installed electrohydraulic systems are energy-demanding and thereby expensive to operate. Also electromechanical systems contain many expensive components and are thereby also expensive to manufacture. Installed electromechanical systems are expensive to operate because of the high energy-demanding friction always inherent in mechanical constructions. Hydraulic pumps as well as mechanical transmissions generate noise that in the long run may be perceived as disturbing.

On production of operating devices of the above-mentioned type, the need thereby arises to manufacture devices consisting of a few inexpensive components and which devices, ready-made and mounted, are silent and inexpensive to operate. The operating device should be a small, compact constructional solution, which does not demand any large mounting space.

None of the operating devices, which are shown in the stated patent specifications, can meet this need.

SUMMARY OF THE INVENTION

On designing operating devices for moveable elements, according to the invention, the designing is to be such that the device includes a few inexpensive components only and that the completed device is not energy-demanding on operation. Furthermore, the object of the invention is that the device is to be a small, compact and easy-to-mount device working at a very low sound level.

The operating device according to the invention should be able to be used generally, regardless if the element should be manœuvred by linear or rotary motion. It is to withstand an exposure to overload and allow also manual operation. In certain environments, it is furthermore necessary that the device has self-closing function.

The trend of operating devices for elements of the present kind is towards more flexible systems, with the device being a standard component. The customer may then decide where and how the device shall be mounted and operate.

In the light of the above-mentioned needs, a operating device should be designed so that it is simple to install and fits for mounting and operation at hinges, butt hinges or at a distance from the hinges, at either end of the element to be operated.

The object of the present invention is thereby to bring about a operating device which fits for most applications, is silent and demands neither large space nor high energy. It should work, for instance, on evacuation situations by permitting opening / closing at power failure.

The solution according to the invention is a operating device, which includes a driving device, arranged adjacent to a closed casing or house. The house is connected to at least one operable element. The transmission of power from the driving device to the operable element to be operated goes via the closed house. The driving device is connected to and drives a first piston means , which is displaceably arranged inside the house. A second piston device is displaceably arranged inside the house at a distance from the first piston device. Inside the closed house, a space is provided by the opposing pressure areas of the first and second piston-like parts and the inner wall of the house. This space is filled with a pressure force-transmitting fluid, which gives a simple, cheap, disengageable and noiseless force transmission. Since the construction works with low friction, the driving device may be a relatively weak motor, i.e. a proportionately small motor. The entire operating device may be housed in a tubular part.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be explained closer by description of an embodiment example with reference to the accompanying drawing, where

fig 1 shows a operating device for the operating of an element according to the invention.
Fig 2 shows an alternative embodiment where the operating device is arranged with an electrically controlled valve.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

The invention relates to a operating device 1 (fig 1) which comprises a driving device 2 in the form of a speed controlled, alternatively non-speed controlled, suitably reversible electric motor arranged directly adjacent to a closed case or house 3. The drive shaft of the electric motor includes a screw and nut device 4-5, for instance a self-locking ball screw, which sealingly extends into the closed house 3. Thereby, a relatively small electric motor may be selected. Inside the closed house 3, the drive shaft / ball roller screw 4 co-operates with a first piston-like part / nut device 5, which is displaceably arranged inside the house 3. A second piston-like part 6 is displaceably arranged inside the house 3 against the action of a spring 14 at a distance from, and suitably coaxially with, the first piston-like part 5. Thereby, a closed volume 7 is provided, which is limited by the inner wall 8 of the house 3 and the opposing end areas 9 and 10 of the first 5 and second 6 piston-like parts, respectively. The volume 7 is filled with a pressure-transmitting medium 11. In figure 1, the closed house 3 consists of two cylindric portions 12, 13 having different diameters. The portion 12 with the smaller diameter may be regarded as one pump cylinder and the first piston-like part 5 is then a pump piston. The incompressible fluid 11 works as a pump fluid. The portion 13 of the house 3 with the larger diameter may thereby be regarded as a slave cylinder or actuator containing the second displaceable piston-like part 6, which is arranged prestressed by a spring. The space between the slave cylinder and the pump cylinder is provided by the opening 14 between the cylinders.

The electric motor 2 is arranged to drive the first piston-like part 5 in two opposite directions. When the electric motor 2 drives the pump piston 5 forwards, in the left direction in fig 1, the pump piston 5 presses against the incompressible fluid 11 and transmits a compressive force which acts on the second piston-like part 6. The compressive force from the incompressible fluid 11 acts on the second piston-like part 6 in the direction towards the spring-prestressing force from a spring device 14. When the driving device 2 via the incompressible fluid 11 has generated a compressive force, on the second piston-like part 6, which exceeds the back-pressure power from the screw spring 14a, a displacement of the second piston-like part is carried out in the left direction in fig 1.

The second piston-like part 6 consists of a hollow piston slotted from one end (not shown) with a rack 15 fixedly arranged on the inside 16 of the piston. The rack 15 is parallel to the direction of motion of the piston 6 and the teeth are formed in a direction, at an angle with the longitudinal direction, preferably a right angle to the longitudinal direction. The rack 15 co-

operates with a gear-wheel 17, which is arranged on a shaft 18 rotatably mounted in the house 3 and extending through the slotted piston 6. The shaft 18 is arranged perpendicularly to the direction of motion of the piston 6 transverse through the piston and is thus rotatably received in the surrounding cylinder wall, i.e. the wall of the closed house 3. The opposite end 20 of the shaft passes through a sealed bearing hole in the surrounding cylinder, i.e. the wall of the closed house, and forms exterior drive shaft 20, with, for instance, splines. The outer drive shaft 20 is connected to a transmission, for instance an arm, which transmits a linear or rotary motion to an element (not shown) to be operated.

The screw 4 runs in the cylinder 5, e.g. in a recess or a bottom hole, and a driving nut 5a is mounted in the piston end adjacent the motor. The extension along the screw 4 of the driving nut 5a is small in comparison with the piston 5. By the fact that the contact surface between the screw 4 and the piston 5 thereby becomes relatively small, the friction will be low.

On displacing the second piston-like part 6 in the direction to the left in fig 1, the rack 15 is displaced in the same direction, and thereby both the gear wheel 17 and the outer drive shaft end 20 are rotated anti-clockwise in fig 1.

When the electric motor 2 moves the pump piston 5 back, in the direction to the right in fig 1, the pressure of the incompressible fluid 11 on the second piston-like part 6 decreases. When the pressure goes below the preset force of the spring, the spring 14a acts on the piston 6 and moves it in the direction to the right in fig 1.

On displacing the second piston-like part 6 the right in fig 1, the rack 15 is displaced in the same direction, and thereby both the gear wheel 17 and the outer drive shaft / driving nut 20 are rotated clockwise in fig 1.

The outer end 20 of the drive shaft may thereby transmit rotary motions so that an element (not shown) is moved either to the right or to the left, or rotates clockwise or anticlockwise, respectively. The transmission ratio may be chosen suitable for the application thereof. Also the requisite pressure may be changed / chosen after application.
It is also simple to adjust the length of stroke for an operable element at both for normal and emergency opening operations.

ALTERNATIVE DESIGNS

The driving device is an electric motor in the embodiment example, but it may also be another, preferably rotating, driving means.

The first and the second piston-like part may be arranged with parallel shafts and may also be arranged so that the shafts form an angle with each other. The piston-like parts can also be arranged in parallel to each other, side by side. In such cases, the house or space becomes a straight / angled / curved room.

The space beyond the slave cylinder, counted from the driving device in the shown embodiment example, is empty but may also contain oil.

The screw-nut device may be of non-self-braking type and the force of the spring used for closing the door. This means that the device is self-closing at power failure.

In the shown embodiment example, the manœuvring is carried out with a speed controlled driving device, but it is also possible to adjust the speed of the element by means of conventional control or check valves.

The first piston device may be formed as a bellows.

The operating device may be arranged to simultaneously bias or operate a plurality of elements, for instance wing doors. It may also be arranged with more than one closed house in order to drive a plurality of elements at the same time.

A safety valve may be arranged so that on onverloading the fluid can flow out into an adjacent space. An alternative is to built-in weak sections at the device, adapted to on overload.

In order to make it possible to return an element to the start position on power failure, an electric current-controlled valve 21 may be arranged in the wall of the house. At power failure, the valve opens and fluid may thereby flow out in an adjacent space 22, the compressive force / back pressure from the incompressible fluid 11 on the second piston-like part 6

decreasing / ceasing, and thereby the spring-prestressing force of the spring 14a may push the piston 6 in the direction to the right in the figure, a connected element returning to the starting position, e.g. a door is closed. In doing so, the device has to be dimensioned in such a way that the first piston-like part never mechanically blocks the second piston-like part from being displaced back to the starting position.

In order for the device to be able to be operated manually at power failure, an electric current-controlled valve 21 may be arranged in the wall of the house. At power failure, the valve opens, if required, and fluid may thereby flow in from an adjacent space (not shown). A connected element is transported manually, the second piston-like part being displaced in the direction to the right in the figure. The manual operating requires a force exceeding the set force of the spring 14a. Furthermore, fluid has to flow into the house 3 from an adjacent room / reservoir (not shown) at the displacement of the second piston-like part 6.

It is important that the electric current-controlled valve never is obstructed by any of the piston devices. Therefore, it is placed in the house wall, between the piston-like parts, but outside the range of movement of these parts along the inner wall 8.

The adjacent room 22 to which fluid flows or from which fluid flows may be arranged in various ways. It may, e.g., be an open vessel, a pressure accumulator or it may contain a piston prestressed by a spring. The room 22a may be provided by arranging the closed house with double walls, where the valve is arranged in the inner wall. The room may be filled with a suitable quantity of gas.

An operating device self-closing at power failure requires that the room, irrespective of the design, has a volume that at least equals the displacing volume of the second piston-like part.

An operating device manually openable at power failure requires that the room, irrespective of design, has at least a volume that equals the double displacing volume of the second piston-like part.

CLAIMS

1. Operating device for doors, gates and such elements (1) including a driving device (2), at least one closed house (3), a first piston-like part (5) and a second piston-like part (6), which parts are displaceable inside the house (3), where the first and second piston-like part are arranged at a distance from each other inside the house, where the driving device (2) is arranged to displace the first piston-like part (5) inside the house and the second piston-like part (6) being connected to a operable element c h a r a c t e r i z e d in that a volume (7) formed in the closed house (3), between the first (5) and the second (6) piston-like part, is filled with a compressive force transmitting medium.

2. Operating device according to claim 1 c h a r a c t e r i z e d in that an electric current-controlled valve (21) is arranged in the wall of the house 3.

3. Operating device according to claim 2 c h a r a c t e r i z e d in that the electric current-controlled valve (21) is located in the wall of the house (3), between the piston-like parts but outside the range of movement of these parts along the inner wall 8.

4. Operating device according to claim 1 c h a r a c t e r i z e d in that the first (5) and second (6) part are coaxially arranged in relation to each other.

5. Operating device according to claim 1 c h a r a c t e r i z e d in that the force-transmitting media (11) consists of a substantially incompressible fluid.

6. Operating device according to claim 1 c h a r a c t e r i z e d in that the second piston-like part (6) is displaceable against the effect of a spring device (14) arranged in the house.

7. Operating device according to claim 6 c h a r a c t e r i z e d in that the spring device (14) is a screw spring (14a).

8. Operating device according to claim 1 c h a r a c t e r i z e d in that the driving device (2) is an electric motor, the drive shaft of which is drivingly connected to the first piston-like part.

9. Operating device according to claim 1 c h a r a c t e r i z e d in that the driving device (2) is arranged to drive the first piston-like part (5) in two opposite directions.

10. Operating device according to claim 1 c h a r a c t e r i z e d in that the second piston-like part (6) is connected to an element, which is to be operated, via a transmission.

11. Operating device according to claim 8 c h a r a c t e r i z e d in that the transmission gives the element a linear motion.

12. Operating device according to claim 8 c h a r a c t e r i z e d in that the transmission gives the element a rotary motion.

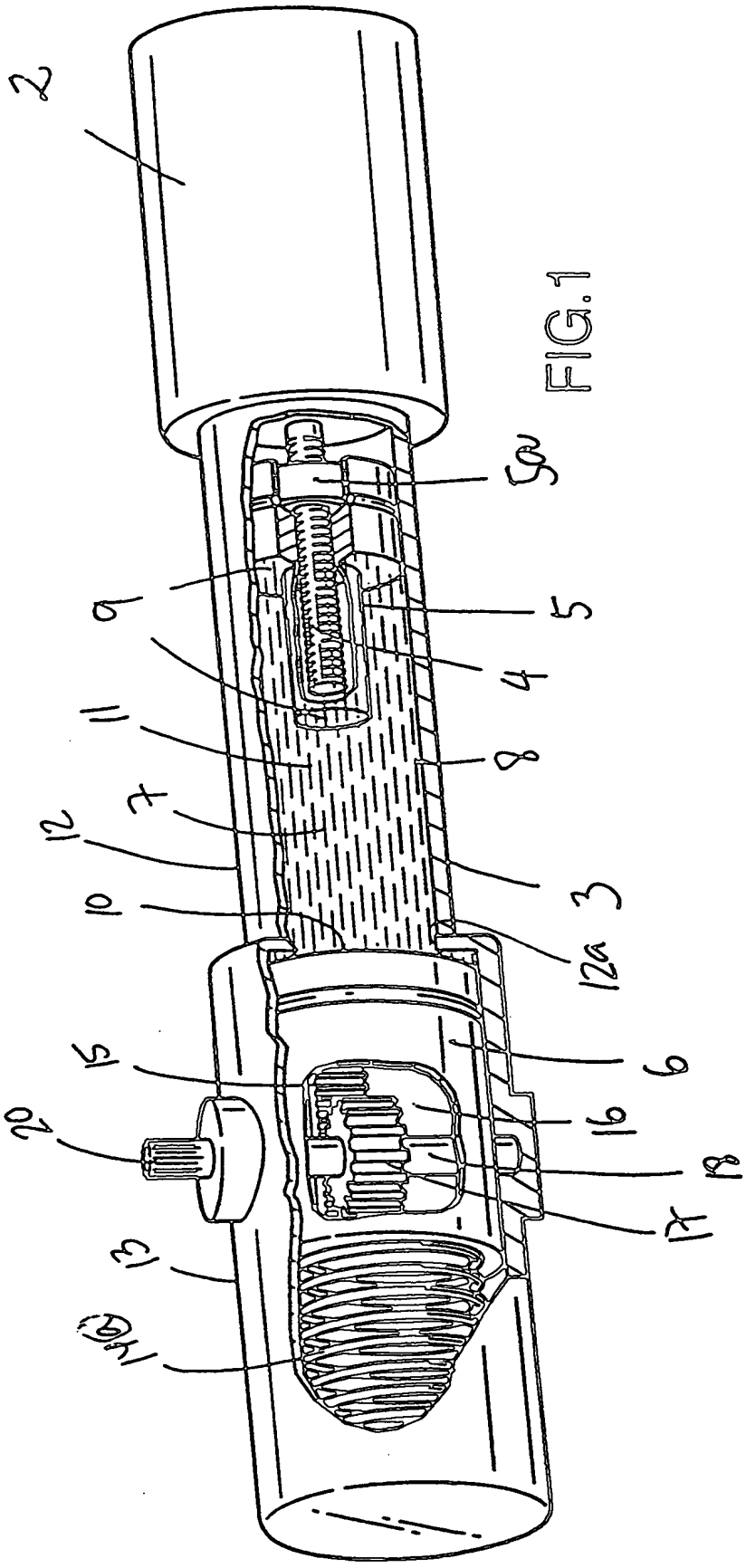

FIG.1

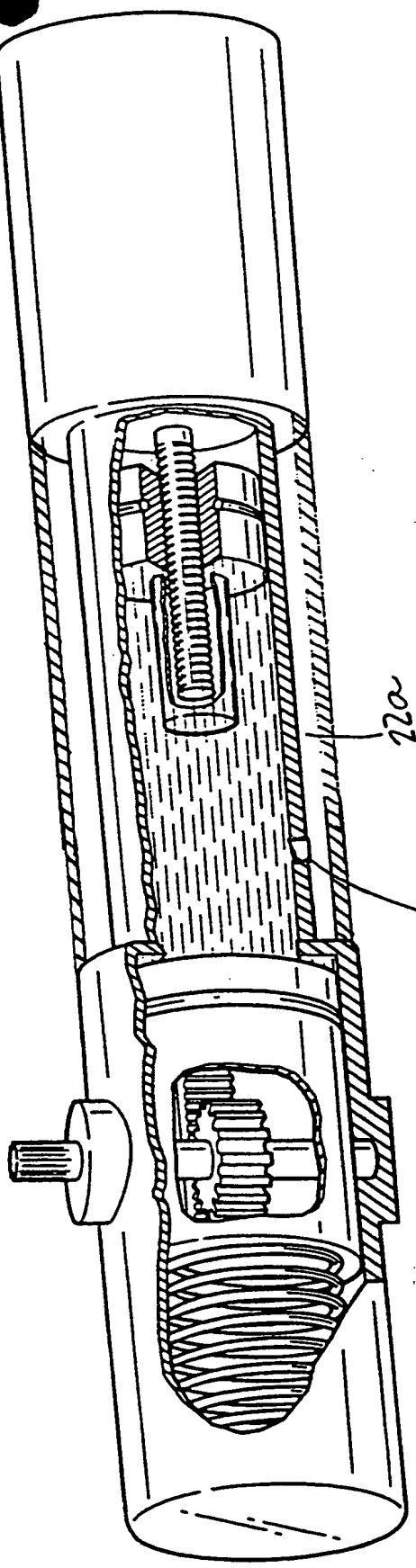

FIG.2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/00836

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E05F 3/00, E05F 15/02, E05F 15/10, F15B 7/00, F15B 15/18
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E05F, F15B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5651162 A (L. KESZTHELYI), 29 July 1997 (29.07.97) --	1-15
Y	US 5513467 A (A. CURRENT ET AL), 7 May 1996 (07.05.96) --	1-15
Y	EP 0166285 A2 (DORMA BAUBESCHLAG GMBH & CO. KG), 2 January 1986 (02.01.86) --	2-3
A	US 5655371 A (S.-C. CHUANG ET AL), 12 August 1997 (12.08.97) --	

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 July 2000	15 -08- 2000
Name and mailing address of the ISA: Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Christer Wendenius / MRo Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/00836

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category°	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5046402 A (J.-H. LAGACE), 10 Sept 1991 (10.09.91) -- --------	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/SE 00/00836

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5651162 A	29/07/97	NONE	
US 5513467 A	07/05/96	NONE	
EP 0166285 A2	02/01/86	SE 0166285 T3	
		DE 3423242 C	07/11/85
		US 4660250 A	28/04/87
US 5655371 A	12/08/97	NONE	
US 5046402 A	10/09/91	NONE	

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
110004601		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE00/00836	03.05.2000	04.05.1999
International Patent Classification (IPC) or national classification and IPC7		
E05F 3/00, E05F 15/02, E05F 15/10, F16B 7/00, F15B 15/18		
Applicant		
Besam AB et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
29.11.2000	06.04.2001
Name and mailing address of the IPEA/SE	Authorized officer
Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88 Telex 17978 PATOREG-S	Christer Wendenius / MRo Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE00/00836

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed

☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language English which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☒ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE00/00836

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-12	YES
	Claims		NO
Inventive step (IS)	Claims	1-12	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-12	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The invention concerns an operating device for doors, gates and such elements as stated in the preamble of claim 1 and aims to design such a devise to include a few inexpensive elements, to be less energy-demanding on operation, to be small, easy-to mount and to be working at low sound levels.

According to the invention, this is achieved by arranging a volume formed in the closed house, between the piston-like parts, to be filled with a compressive force transmitting medium as stated in the characterising part of claim 1.

From US 5651162 is known a device of the kind stated in the preamble if claim 1. A force is transmitted between the piston-like parts by means of a rod.

From US 5513467 is known an operating device for a door comprising an element for transmitting force, wherein the force is transmitted by a medium.

The force transmitting element is not adapted to be used in a device of the kind stated in the preamble of claim 1 and does not include a volume formed in the closed house and between the piston-like parts as in the invention.

As the device in claim 1 is new, is regarded to contain an inventive step, and also is industrially applicable, the patentability criteria are met.

RECORD COPY

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No. PCT/SE 00 / 00836

International Filing Date 03 -05- 2000

The Swedish Patent Office
PCT International Application

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* 110004601/CF

Box No. I TITLE OF INVENTION

Operation Device.

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)*

BESAM AB
BOX 131
SE-261 22 LANDSKRONA
SWEDEN

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State *(that is, country)* of nationality: SWEDEN

State *(that is, country)* of residence: SWEDEN

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)*

OLSSON, Olle
Box 131
SE-261 22 LANDSKRONA
SWEDEN

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: SWEDEN

State *(that is, country)* of residence: SWEDEN

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below ~~is hereby~~/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

Petré, Urban
AB STOCKHOLMS PATENTBYRÅ , Zacco & Bruhn
Box 23101, SE-104 35 STOCKHOLM, Sweden

Telephone No. +46 8 729 95 00

Facsimile No. +46 8 31 83 15

Teleprinter No.

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked):*

Regional Patent

☒ **AP** **ARIPO Patent:** **GH** Ghana, **GM** Gambia, **KE** Kenya, **LS** Lesotho, **MW** Malawi, **SD** Sudan, **SL** Sierra Leone, **SZ** Swaziland, **TZ** United Republic of Tanzania, **UG** Uganda, **ZW** Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT

☒ **EA** **Eurasian Patent:** **AM** Armenia, **AZ** Azerbaijan, **BY** Belarus, **KG** Kyrgystan, **KZ** Kazakhstan, **MD** Republic of Moldova, **RU** Russian Federation, **TJ** Tajikistan, **TM** Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

☒ **EP** **European Patent:** **AT** Austria, **BE** Belgium, **CH** and **LI** Switzerland and Liechtenstein, **CY** Cyprus, **DE** Germany, **DK** Denmark, **ES** Spain., **FI** Finland, **FR** France, **GB** United Kingdom, **GR** Greece, **IE** Ireland, **IT** Italy, **LU** Luxembourg, **MC** Monaco, **NL** Netherlands, **PT** Portugal, **SE** Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT

☒ **OA** **OAPI Patent:** **BF** Burkina Faso, **BJ** Benin, **CF** Central African Republic, **CG** Congo, **CI** Côte d'Ivoire, **CM** Cameroon, **GA** Gabon, **GN** Guinea, **GW** Guinea-Bissau, **ML** Mali, **MR** Mauritania, **NE** Niger, SN Senegal, **TD** Chad, **TG** Togo, and any other State which is a member State of OAPI and a Contracting State of the FCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line):*

☒	**AE**	United Arab Emirates	☒	**LR**	Liberia
☒	**AL**	Albania	☒	**LS**	Lesotho
☒	**AM**	Armenia	☒	**LT**	Lithuania
☒	**AT**	Austria and utility model.	☒	**LU**	Luxembourg
☒	**AU**	Australia	☒	**LV**	Latvia
☒	**AZ**	Azerbaijan	☒	**MA**	Morocco
☒	**BA**	Bosnia and Herzegovina	☒	**MD**	Republic of Moldova
☒	**BB**	Barbados	☒	**MG**	Madagascar
☒	**BG**	Bulgaria	☒	**MK**	The former Yugoslav Republic of Macedonia.
☒	**BR**	Brazil	☒	**MN**	Mongolia
☒	**BY**	Belarus	☒	**MW**	Malawi
☒	**CA**	Canada	☒	**MX**	Mexico
☒	**CH and LI**	Switzerland and Liechtenstein	☒	**NO**	Norway
☒	**CN**	China	☒	**NZ**	New Zealand
☒	**CR**	Costa Rica	☒	**PL**	Poland
☒	**CU**	Cuba	☒	**PT**	Portugal
☒	**CZ**	Czech Republic and utility model	☒	**RO**	Romania
☒	**DE**	Germany and utility model	☒	**RU**	Russian Federation
☒	**DK**	Denmark and utility model	☒	**SD**	Sudan
☒	**DM**	Dominica	☒	**SE**	Sweden
☒	**EE**	Estonia and utility model	☒	**SG**	Singapore
☒	**ES**	Spain	☒	**SI**	Slovenia
☒	**FI**	Finland and utility model	☒	**SK**	Slovakia and utility model
☒	**GB**	United Kingdom	☒	**SL**	Sierra Leone
☒	**GD**	Grenada	☒	**TJ**	Tajikistan
☒	**GE**	Georgia	☒	**TM**	Turkmenistan
☒	**GH**	Ghana	☒	**TR**	Turkey
☒	**GM**	Gambia	☒	**TT**	Trinidad and Tobago
☒	**HR**	Croatia	☒	**TZ**	Tanzania
☒	**HU**	Hungary	☒	**UA**	Ukraine
☒	**ID**	Indonesia	☒	**UG**	Uganda
☒	**IL**	Israel	☒	**US**	United States of America
☒	**IN**	India	☒	**UZ**	Uzbekistan
☒	**IS**	Iceland	☒	**VN**	Viet Nam
☒	**JP**	Japan	☒	**YU**	Yugoslavia
☒	**KE**	Kenya	☒	**ZA**	South Africa
☒	**KG**	Kyrgyzstan	☒	**ZW**	Zimbabwe
☒	**KP**	Democratic People's Republic of Korea			Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after Issuance of this sheet:
☒	**KR**	Republic of Korea			
☒	**KZ**	Kazakhstan	☒	**DZ**	Algeria
☒	**LC**	Saint Lucia	☒	**AG**	Antigua and Barbuda
☒	**LK**	Sri Lanka			

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)*

Supplemental box *If the Supplem[illegible]Box is not used, this sheet should not be included in the[illegible]t.*

1. *If, in any of the Boxes, **the space is insufficient** to furnish all the information: in such case, write "Continuation of Box No. ..." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular.*

(i) ***If more than two persons are involved as applicants and/or inventors** and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is country) of residence if no State of residence is indicated below:*

(ii) ***If, in Box No. II or in any of the sub-boxes of Box No. III, the indication** "the States indicated in the Supplemental Box" **is checked: in such case, write "Continuation of Box No II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant:***

(iii) ***If, in Box No. II or in any of the sub-boxes of Box No. III,** the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: **in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicated the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor:***

(iv) ***If, in addition to the agent(s) indicated in Box No IV, there are** further agents: **in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;***

(v) ***If, in Box No. V, the name of any State (orOAPI) is accompanied by the indication** "patent addition" **or** "certificate of addition" **or if, in Box No V, the name of the United States of America is accompanied by an indication "continuation"** or **"continuation-in-part"**: in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application:*

(vi) ***If, in Box No VI, there are** more than three earlier applications whose priority is claimed: **in such case, write "Continuation of Box No VI" and indicated for each additional earlier application the same type of information as required in Box No VI:***

(vii) ***If, in Box No VI,** the earlier application is an ARIPO application: **in such case, write "Continuation of Box No VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.***

2 ***If, whit regard to the** precautionary designation statement **contained in Box No V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.***

3 ***If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning** non-prejudicial disclosures of exceptions to lack of novelty: **in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.***

CONTINUATION OF BOX IV:

Further representatives:

Agvald-Glas, Gunilla
Bernhult, Lennart
Bjerndell, Per
Brundin; Gabriella
Grahn, Cecilia
Granström, Lars-Eric
Grip, Joakim
Hansson, Hans-Erik
Hansson, Sven A.
Hinz, Udo
Karlsson, Per Tomas
Lennefors, Stefan
Lundström, Maria
Nilsson, Brita
Nordén, J. Åke
Onn, Thorsten
Petré, Urban
Rilton, Kristina
Westerlund, Örjan
Åström, Elsa

Box No. VI PRIORITY CLAIM ☐ Further priority claims indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is: national application: country	regional application: * regional Office	international application: receiving Office
item (1) 04/05/1999 04 May 1999	9901600-8	SWEDEN		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): (1)

* *Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):*

ISA /SE

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date (day/month/year)	Number	Country (or regional Office)
04/05/1999	SE 99/00593	SWEDEN

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets**:

request	:4 ✓
description (excluding sequence listing part)	:7 ✓
claims	:2 ✓
abstract	:1 ✓
drawings	:2 ✓
sequence listing part of description	:
Total number of sheets:	16

This international application is **accompanied by** the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☒ other *(specify)*: List of representatives , copy of ITS report

Figure of the drawings which should accompany the abstract: Fig. 1

Language of filing of the international application: SWEDISH

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Stockholm, May 3, 2000

Urban Petré
Representative of the applicant

For receiving Office use only

1. Date of actual receipt of the purported international application:	03 -05- 2000	2. Drawings: ☒ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA / SE	☐ 6. Transmittal of search copy delayed until search fee is paid	

For International Bureau use only

Date of receipt of the record copy by the International Bureau: 15 JUNE 2000 (15. 06. 00)

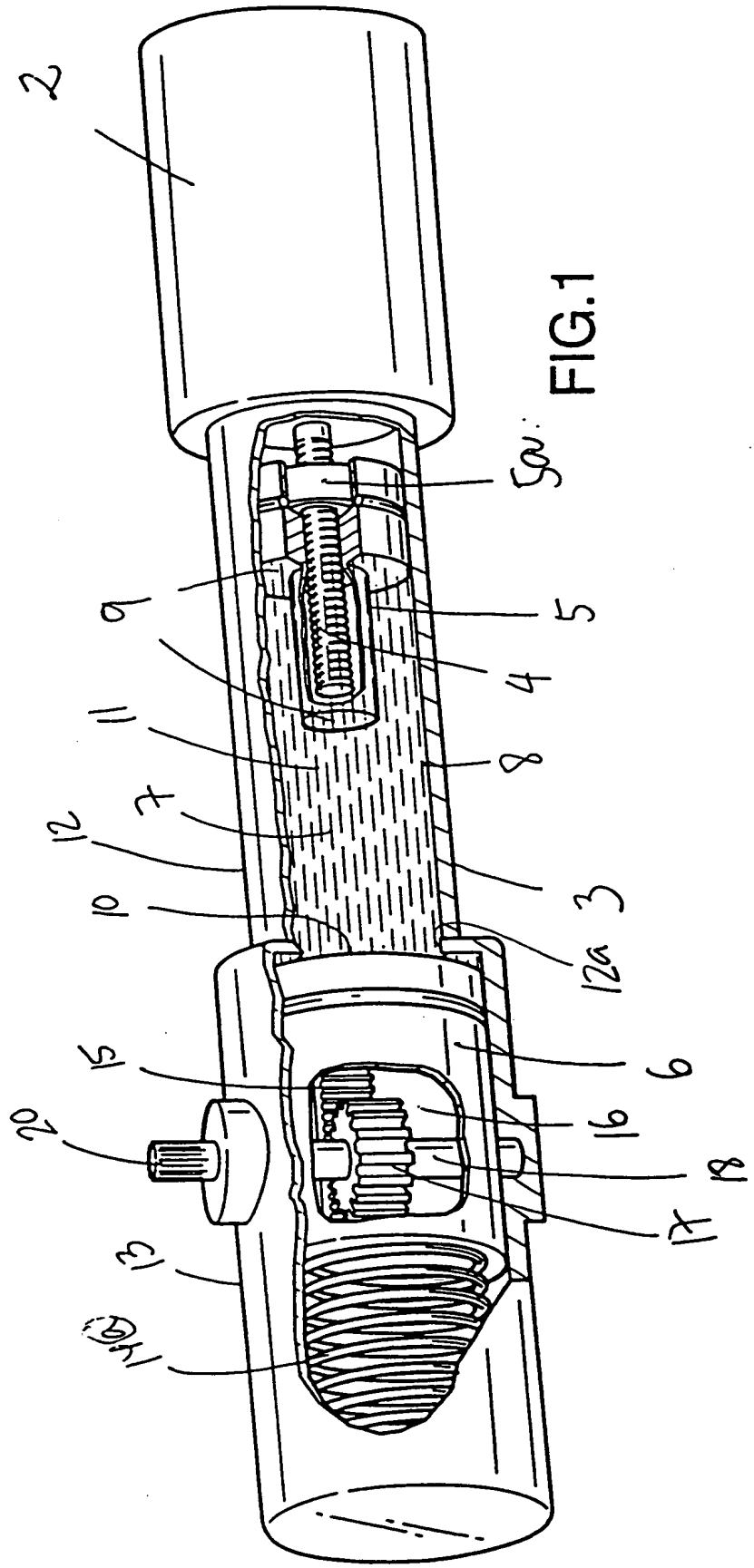

FIG.1

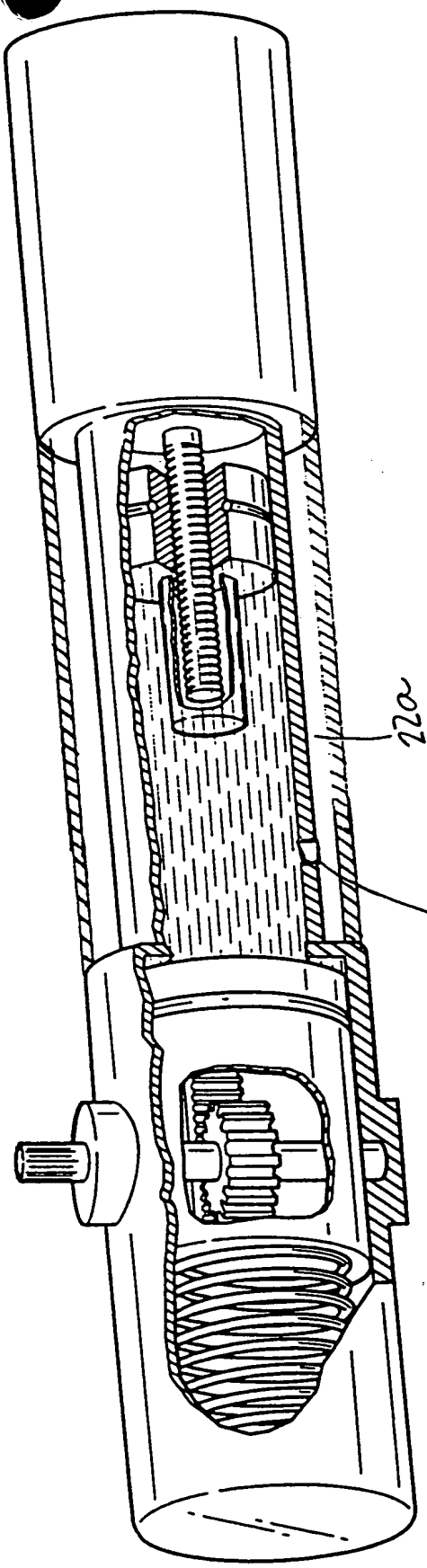

FIG.2

Manövreringsanordning Operation device

TEKNISKT OMRÅDE

Föreliggande uppfinning hänför sig till en anordning för manövrering av företrädesvis dörrar, grindar, portar och dylika manövrerbara element.

TEKNIKENS STÅNDPUNKT

Vid manövreringsanordningar för dörrar, grindar och dylika element är det vanligt att använda el-hydrauliska system. Om manövreringsanordningen ska klara av pivotdrift är det vanligare med ett el-mekaniskt system. Oavsett val av system uppstår problem när en manövreringsanordning ska monteras vid ett redan befintligt manövrerbart element. Det befintliga utrymmet vid tex en dörr är en begränsande faktor. Detta kan framtvinga dyra ombyggnadskostnader för att modifiera utrymmet. Vid nyproduktion ökar också kostnaderna när manövreringsanordningar tar utrymme i anspråk.

Med bestämningen manövreringsanordning för element avses anordningar som får dörrar, grindar och dylikt att röra sig endera linjärt eller att svänga. Anordningarna medger vänster- eller högerhängda element, ytter- eller innerelement och anordningarna kan placeras på valfri sida av elementet.

Patentskriften GB 1 406 126 visar en el-hydraulisk dörröppnare och syftet med uppfinningen är att göra en utrymmessnål och behändig anordning. Dörröppnaren innefattar en kombination av hydraulmotor, hydraulvätsketank, motordriven hydraulpump och hydraulledningar som tillsammans bildar en sluten hydraulisk krets / slinga. En roterande motor driver manövreringen av pumpen. För att spara utrymme är ett fjäderhus 14 även hydraulvätsketank.

Patentskriften US 4 333 270 visar en el-mekanisk dörröppnare. Syftet med uppfinningen är att göra en dörröppnare vilken är billig att tillverka och vilken passar för olika typer av svängbara dörrar. Dessutom är syftet att göra en dörröppnare, vilken bla har lång livslängd. Lösningen bygger på en konstruktion som bla innehåller kuggstång och kugghjul. Den innehåller inte någon hydraulik.

Problem uppstår när manövreringsanordningen ska vara billig att tillverka, billig i drift och tyst. El-hydraulsystemen innehåller många och dyra komponenter och blir därmed dyra att

tillverka. Installerade el-hydraulsystem är energikrävande och är därmed dyra i drift. Även el-mekaniska system innehåller många dyra komponenter och är därmed också dyra att tillverka. Installerade el-mekaniska system är dyra i drift på grund av den höga energikrävande friktionen som alltid finns i mekaniska konstruktioner. Såväl hydraulpumpar som mekaniska transmissioner alstrar ljud som i längden kan uppfattas som störande.

Vid tillverkning av manövreringsanordningar av ovan angivet slag uppkommer därmed behovet av att tillverka anordningar bestående av ett fåtal billiga komponenter och vilka anordningar, färdigtillverkade och monterade, är tystgående och billiga i drift. Manövreringsanordningen bör vara en liten, kompakt konstruktionslösning, som inte kräver stort monteringsutrymme.

Detta behov kan inte någon av manövreringsanordningarna, som visas i de anförda skrifterna, uppfylla.

REDOGÖRELSE FÖR UPPFINNINGEN

Vid utformning av manövreringsanordningar för element är syftet enligt uppfinningen att utforma manövreringsanordningen så att den består av ett fåtal billiga komponenter och att den färdiga anordningen inte är energikrävande vid drift. Dessutom är syftet med uppfinningen att den ska vara en liten, kompakt och lättmonterad anordning som arbetar vid mycket låg ljudnivå.
Manövreringsanordningen enligt uppfinningen ska kunna användas generellt oavsett om elementet ska manövreras genom linjär eller roterande rörelse. Den ska klara av att utsättas för överbelastning och fungera vid manuell manövrering. I vissa miljöer är det dessutom nödvändigt att anordningen är funktionellt självstängande.

Utvecklingen av manövreringsanordningar för element går mot flexiblare system där anordningen blir ett standardkoncept. Kunden får sedan bestämma var och hur anordningen ska appliceras och verka.

Mot bakgrund av ovannämnda behov bör en manövreringsanordning utformas så att den är enkel att installera och passar för montering och drift vid gångjärn, kantgångjärn eller på avstånd från gångjärnen, vid endera änden av elementet som ska manövreras.

Syftet med föreliggande uppfinning är därmed att åstadkomma en manövreringsanordning som passar för de flesta tillämpningar, är tystgående och som inte kräver vare sig stor plats eller är energikrävande. Den ska fungera exempelvis vid utrymning genom att medge öppning / stängning vid strömavbrott.

Lösningen enligt uppfinningen är en manövreringsanordning vilken innefattar en drivanordning anordnad i anslutning till ett slutet hus. Huset är sammankopplat med minst ett manövrerbart element. Kraftöverföringen från drivanordningen till det manövrerbara elementet går via det slutna huset. Drivanordningen är sammankopplad med och driver en första kolvliknande del, vilken är förskjutbart anordnad inuti huset. En andra kolvliknande del är förskjutbart anordnad inuti huset på avstånd från den första kolvliknande delen. I det slutna huset bildas ett rum / en volym mellan de första och andra kolvliknande delarnas tryckytor och husets innervägg. Volymen är fylld med ett tryckkraftöverförande medium, vilket ger en enkel, billig, frikopplingsbar och ljudlös kraftöverföring. Eftersom konstruktionen arbetar med låg friktion kan drivanordningen vara en relativt sett svagare motor, vilket betyder en förhållandevis liten motor. Hela manövreringsanordningen kan rymmas i en rörformad del.

FIGURBESKRIVNING

Uppfinningen kommer att förklaras närmare genom beskrivning av ett utföringsexempel under hänvisinng till bifogade ritning, där

fig 1 visar en manövreringsanordning för manövrering av ett element i enlighet med uppfinningen.

fig 2 visar en alternativ utföringsform där manövreringsanordningen är anordnad med en elektriskt strömstyrd ventil.

BESKRIVNING AV UTFÖRINGSEXEMPEL

Uppfinningen avser en manövreringsanordning 1 (fig 1) vilken innefattar en drivanordning 2 i form av en hastighetsreglerad alternativt icke hastighetsreglerad, lämpligen omkastbar elmotor anordnad i direkt anslutning till ett slutet hus 3. Elmotorns drivaxel utgörs av en skruv-mutteranordning 4-5, exempelvis en självhämmande kulskruv, som avtätat sträcker sig in i det slutna huset 3. Därigenom kan elmotorn väljas förhållandevis liten. Inuti det slutna huset 3 samverkar drivaxeln / kulskruven 4 med en första kolvliknande del / mutteranordning

5, vilken är förskjutbart anordnad inuti huset 3. En andra kolvliknande del 6 är förspänd mot verkan av en fjäderanordning 14 förskjutbart anordnad inuti huset 3 på avstånd från och lämpligen koaxiellt med den första kolvliknande delen 5 . Härvid bildas en volym 7, vilken begränsas av husets 3 innervägg 8 mellan första 5 och andra 6 kolvliknande delarnas tryckytor 9 resp 10. Volymen 7 är fylld med ett trycköverförande medium 11. I figur 1 består det slutna huset 3 av två cylindriska partier 12, 13 med olika diametrar. Partiet 12 med den mindre diametern, kan anses vara en pumpcylinder och den första kolvliknande delen 5 är då en pumpkolv. Den inkompressibla vätskan 11 fungerar som pumpvätska. Husets 3 parti 13 med den större diametern, kan därmed anses vara en slav- eller servocylinder innehållande den andra förskjutbara kolvliknande delen 6 vilken är fjäderförspänt anordnad. Utrymmet mellan servocylindern och pumpcylindern bildas genom att cylindrarna kommunicerar med varandra genom en öppning 12a.

Elmotorn 2 är anordnad att driva den första kolvliknande delen 5 i två motsatta riktningar. När elmotorn 2 driver pumpkolven 5 framåt, i riktning vänster i fig 1, trycker pumpkolven 5 mot den inkompressibla vätskan 11 och överför en tryckkraft som verkar på den andra kolvliknande delen 6. Tryckkraften från den inkompressibla vätskan 11 verkar på den andra kolvliknande delen 6 i riktning mot fjäderförspänningskraften från en fjäderanordning 14. När drivanordningen 2 via den inkompressibla vätskan 11 har alstrat en tryckkraft, på den andra kolvliknande delen 6, vilken överstiger mottryckkraften från skruvfjädern 14a sker en förskjutning av den andra kolvliknande delen i riktning vänster i fig 1.

Den andra kolvliknande delen 6 utgörs av en från ena änden ihålig kolv uppslitsad (inte visad) med en kuggstång 15 fast anordnad på kolvens insida 16. Kuggstången 15 är parallell med kolvens 6 rörelseriktning och kuggarna är utformade i en riktning som bildar vinkel med längdriktningen, företrädesvis rät vinkel mot längdriktningen. Kuggstången 15 samverkar med ett kugghjul 17, vilket är anordnat på en axel 18 roterbart lagrad i huset 3 och genomlöpande den uppslitsade kolven 6. Axeln 18 är anordnad vinkelrät mot kolvens 6 rörelseriktning tvärs igenom kolven och är alltså roterbart lagrad i den omslutande cylinderväggen dvs det slutna husets 3 vägg. Axelns motsatta ände 20 passerar genom ett avtätat lagerhål i den omslutande cylindern dvs det slutna husets vägg och utgör en utgående / yttre drivaxel 20 exempelvis utformad med räfflor eller splines. Den yttre drivaxeln 20 är sammankopplad med en transmission exempelvis en arm som överför linjär eller roterande rörelse till ett manövreringbart element (inte visat).

Skruven 4 löper i cylindern 5 tex i en urtagning eller ett bottenhål och en kulhylsa / drivmutter 5a är monterad i kolvens närmast motorn belägna ände. Kulhylsan 5a har en liten utsträckning längs skruven 4 vid jämförelse med kolven 5. Genom att kontaktytan mellan skruven 4 och kolven 5 därmed blir förhållandevis liten blir friktionen låg.

När den andra kolvliknande delen 6 förskjuts i riktning till vänster i fig 1 innebär det att kuggstången 15 förskjuts i samma riktning, därmed roteras både kugghjulet 17 och den yttre drivaxeln / axeltappen 20 motsols i fig 1.

När elmotorn 2 driver pumpkolven 5 tillbaka, i riktning höger i fig 1, minskar tryckkraften från den inkompressibla vätskan 11 på den andra kolvliknande delen 6. När tryckkraften understiger fjäderförspänningskraften verkar skruvfjädern 14a på kolven 6 och trycker den i riktning höger i fig 1.

När den andra kolvliknande delen 6 förskjuts i riktning till höger i fig 1 innebär det att kuggstången 15 förskjuts i samma riktning, därmed roteras både kugghjulet 17 och den yttre drivaxeln / drivmuttern 20 medsols i fig 1.

Den yttre drivaxeln / drivmuttern 20 kan därmed överföra rotationsrörelser så att ett element (inte visat) förflyttas endera till höger eller vänster resp. roterar med- eller motsols. Utväxlingen kan väljas lämplig för sin applikation. Även den erfoderliga tryckkraften kan växlas / väljas efter applikation.
Det är även enkelt att reglera slaglängden för ett manövrerbart element dels vid normal öppning och dels vid nödöppning.

ALTERNATIVA UTFORMNINGAR

Drivanordningen är en elmotor i utföringsexemplet, men den kan även vara andra företrädesvis roterande drivkällor.

Den första och den andra kolvliknande delen kan anordnas med parallella axlar och kan även anordnas så att axlarna bildar vinkel med varandra. En ytterligare variant är att de

kolvliknande delarna anordnas parallella och sida vid sida. I samtliga fallen blir utrymmet ett rakt / vinklat / krökt rum.

Utrymmet bortom servocylindern från drivanordningen räknat i det visade utföringsexemplet är torrt men kan även innehålla olja.

Skruv-mutteranordningen kan vara icke självhämmande varvid tryckraften från fjädern stänger dörren. Det innebär att anordningen är självstängande vid elavbrott.

I det visade utföringsexemplet utförs manövreringen med en hastighetsreglerad drivanordning, men det är även möjligt att reglera det manövrerade elementets hastighet med traditionella regler / backventiler.

Den första kolvliknande delen kan vara utformad som en bälg.

Manövreringsanordningen kan vara installerad för att driva flera element samtidigt, exempelvis pardörrar. Den kan även vara anordnad med flera slutna hus för att driva flera element samtidigt.

Vid överbelastning av anordningen kan en säkerhetsventil anordnas för att vätska ska kunna strömma ut i ett angränsade rum. Ett alternativ är att det i uppfästningen av anordningen finns inbyggt en medveten svaghet, som brister vid överbelastning.

För att anordningen vid elavbrott ska återföra ett element till utgångsläget kan en elektriskt strömstyrd ventil 21 anordnas i husets vägg. Vid elavbrott öppnar ventilen och vätska kan därmed strömma ut i ett angränsande rum 22 varvid tryckkraften / mottrycket från den inkompressibla vätskan 11 på den andra kolvliknande delen 6 minskar / upphör och därmed kan fjäderförspänningskraften hos fjädern 14a trycka på kolven 6 i riktning höger i figuren varvid ett anslutet element återgår till utgångsläget tex en dörr stängs. Härvid måste anordningen dimensioneras så att den första kolvliknande delen aldrig mekaniskt hindrar den andra kolvliknande delen att förskjutas tillbaka till utgångsläget.

För att anordningen vid elavbrott ska kunna manövreras manuellt kan en elektriskt strömstyrd ventil 21 vara anordnad i husets vägg. Vid elavbrott öppnar ventilen vid behov och vätska kan

därmed strömma in från ett angränsande rum (inte visat). Ett anslutet element förflyttas manuellt varvid den andra kolvliknande delen förskjuts i riktning höger i figuren. Den manuella manövreringen kräver en kraft som överstiger fjäderförspänningskraften hos fjädern 14a. Dessutom måste vätska strömma in i huset 3 från en angränsande rum / reservoir (inte visad) vid den andra kolvliknande delens 6 förskjutning.

Det är viktigt att den elektriskt strömstyrda ventilen aldrig blir täckt av någon av de kolvliknande delarna. Därför är den placerad i huset vägg, mellan de kolvliknande delarna, men utanför respektive delars rörelseområde längs innerväggen 8.

Det angränsande rummet 22 till vilket vätska strömmar eller från vilket vätska strömmar kan vara anordnat på olika sätt. Det kan tex vara ett öppet kärl, en tryckackumulator eller det kan innehålla en fjäderförspänd kolv. Rummet 22a kan bildas genom att det slutna huset anordnas med dubbla väggar, där ventilen är anordnad i den inre väggen. Rummet kan vara fyllt med en lämplig mängd gas.

En vid elavbrott självstängande manövreringsanordingen kräver att rummet oavsett utformning har en volym, som åtminstone motsvarar den andra kolvliknande delens deplaceringsvolym.

En vid elavbrott manuellt öppningsbar manövreringsanording kräver att rummet oavsett utformning har åtminstone en volym som motsvarar den andra kolvliknande delens dubbla deplaceringsvolym.

PATENTKRAV

1. Manövreringsanordning för dörrar, grindar, portar och dylika element (1) innefattande en drivanordning (2), minst ett slutet hus (3), en första kolvliknande del (5) och en andra kolvliknande del (6), vilka delar är förskjutbara inuti huset (3), där första och andra kolvliknande delen är anordnade på avstånd från varandra inuti huset, där drivanordningen (2) är anordnad att förskjuta den första kolvliknande delen (5) inuti huset och varvid den andra kolvliknande delen (6) är sammankopplad med ett manövreringsbart element k ä n n e t e c k n a d a v att en i det slutna huset (3), mellan den första (5) och den andra (6) kolvliknande delen bildad volym (7) är fylld med tryckkraftöverförande medium (11).

2. Manövreringsanordning i enlighet med patentkrav 1 k ä n n e t e c k n a d a v att en elektriskt strömstyrd ventil (21) är anordnad i husets 3 vägg.

3. Manövreringsanordning i enlighet med patentkrav 2 k ä n n e t e c k n a d a v att den elektriskt strömstyrda ventilen (21) är placerad i husets (3) vägg, mellan de kolvliknande delarna men utanför respektive delars rörelseområde längs innerväggen 8.

4. Manövreringsanordning i enlighet med patentkrav 1 k ä n n e t e c k n a d a v att den första (5) och andra (6) delen är koaxiellt anordnade i förhållande till varandra.

5. Manövreringsanordning i enlighet med patentkrav 1 k ä n n e t e c k n a d a v att det trycköverförande mediet (11) utgörs av en väsentligen inkompressibel vätska.

6. Manövreringsanordning i enlighet med patentkrav 1 k ä n n e t e c k n a d a v att den andra kolvliknande delen (6) är förskjutbar mot verkan av en fjäderanordning (14) anordnad i huset.

7. Manövreringsanordning i enlighet med patentkrav 6 k ä n n e t e c k n a d a v att fjäderanordningen (14) är en skruvfjäder (14a).

8. Manövreringsanordning i enlighet med patentkrav 1 k ä n n e t e c k n a d a v att drivanordningen (2) är en elektrisk motor vars drivaxel (4) är drivande sammankopplad med den första kolvliknande delen (5).

9. Manövreringsanordning i enlighet med patentkrav 1 k ä n n e t e c k n a d a v att drivanordningen (2) är anordnad att driva den första kolvliknande delen (5) i två motsatta riktningar.

10. Manövreringsanordning i enlighet med patentkrav 1 k ä n n e t e c k n a d a v att den andra kolvliknande delen (6) är sammankopplad med ett elementet, som ska manövreras, via en transmission.

11. Manövreringsanordning i enlighet med patentkrav 8 k ä n n e t e c k n a d a v att transmissionen ger elementet en linjär rörelse.

12. Manövreringsanordning i enlighet med patentkrav 8 k ä n n e t e c k n a d a v att transmissionen ger elementet en roterande rörelse.

SAMMANDRAG

Uppfinningen avser en anordning för öppning av dörrar. El-mekaniska system innehåller många dyra komponenter och är därmed dyra att tillverka. Installerade el-mekaniska system är dyra i drift på grund av den höga och energikrävande friktionen som alltid finns i mekaniska konstruktioner. Föreliggande manövreringsanording är mindre energikrävande genom den utformade kraftöverföringen med två kolvliknande delar 5 och 6. En drivanordning 2 är anordnad att driva den kolvliknande delen 5 och den andra kolvliknande delen 6 är sammankopplad med ett manövreringsbart element.

(fig 1)